CLAIMS

What is claimed is:

1. (Currently Amended) A millimeter wave (MMW) antenna array, comprising:

a continuous transverse stub (CTS) radiating aperture comprising a set of spaced continuous transverse stubs, each having a longitudinal extent, wherein said radiating aperture comprises a waveguide structure comprising an upper conductive plate structure defining the set of continuous transverse stubs and a lower conductive plate structure disposed in a spaced relationship relative to the upper plate structure;

an excitation source for providing excitation signals in a MMW frequency range;

a feed system coupled to [[an]] the excitation source for exciting the stubs with MMW electromagnetic energy having a linear phase progression along the longitudinal extent of the stubs to produce an array beam which [[can be]] is scanned over a beam scan range by changing the frequency of the excitation source, wherein the feed system includes a sinuous feed network coupled to a plurality of feed elements to provide a linear progressive phase shift in the electromagnetic wave along the feed source.

2. (Canceled) The array of Claim 1, wherein said radiating aperture comprises:

a waveguide structure comprising an upper conductive plate structure defining the set of continuous transverse stubs and a lower conductive plate structure disposed in a spaced relationship relative to the upper plate structure.

3. (Currently Amended) The array of Claim [[2]] 1, wherein the feed system comprises a feed network for launching a parallel plate mode electromagnetic wave into the waveguide structure at an end of the waveguide structure.

4. (Canceled) The array of Claim 2, wherein the feed network includes a sinuous feed network coupled to a plurality of feed elements to provide the linear progressive phase shift in the electromagnetic wave along the feed source.

5. (Currently Amended) The array of Claim [[4]] 1 , wherein the plurality of feed elements have a nominal spacing of one half wavelength at an operating frequency, and wherein respective adjacent feed elements are connected by a length of the sinuous feed

network having a nominal electrical length of an integer wavelength multiple at an operating frequency in said MMW frequency range.

6. (Currently Amended) The array of Claim [[4]], 1 wherein the sinuous feed network has an input/output port at a first end, and a termination at a distal end.

7. (Currently Amended) The array of Claim [[4]] 1 , further comprising:

a transmit/receive module coupled to an input/output port of [[the]] a sinuous feed.

8. (Currently Amended) The array of Claim [[4]] 1,wherein the sinuous feed network includes a plurality of transition ports, the feed system further comprising a plurality of transmit/receive modules, each module respectively coupled between a transition port and a corresponding feed element.

9. (Original) The array of Claim 1, wherein the excitation source is scannable over the MMW frequency range to produce a scanned frequency output signal as a function of time.

10. (Currently Amended) A W-band antenna array, comprising:

a continuous transverse stub (CTS) radiating aperture comprising a two-dimensional set of CTS subarrays arranged in rows and columns, each subarray comprising a set of spaced continuous transverse stubs having a longitudinal extent; and

a feed system coupled to an excitation source for exciting the stubs with W-band electromagnetic energy having a linear phase progression along the longitudinal extent of the stubs to produce an array beam which [[can be]] is scanned along a first direction over a beam scan range by changing an operating frequency of the excitation source over a W-band frequency range, wherein the feed system includes a sinuous feed network coupled to a plurality of feed elements to provide a linear progressive phase shift.

11. (Canceled) The array of Claim 10, wherein the feed system includes a sinuous feed network coupled to a plurality of feed elements to provide the linear progressive phase shift.

12. (Currently Amended) The array of Claim [[11]] 10, wherein the plurality of feed elements have a nominal spacing of one half wavelength at an operating frequency, and wherein respective adjacent feed elements are connected by a length of the sinuous feed network having a nominal electrical length of an integer wavelength multiple at the operating frequency.

13. (Currently Amended) The array of Claim [[11]] 10, wherein the sinuous feed network has an input/output port at a first end, and a termination at a distal end.

14. (Canceled) The array of Claim 10, wherein the feed system includes, for a set of said subarrays arranged end to end along a longitudinal extent of the array:

for each subarray of said set, an input/output (I/O) port coupled to a subarray sinuous feed network and a plurality of spaced feed elements coupled to the sinuous feed network to provide a linear progressive phase shift for excitation signals applied to the subarray;

a main (I/O) port;

a series arrangement of delay lines connected to the main I/O port;

a coupler arrangement for coupling an end of each delay line to a corresponding one of the I/O ports of said set of subarrays.

15. (Currently Amended) The array of Claim [[14]] 23 , wherein the linear progressive phase shift is 360 degrees at a predetermined operating frequency in said frequency range.

16. (Original) The array of Claim 15, wherein the array beam is at broadside for said predetermined operating frequency, and said beam is moved away from broadside as the operating frequency is changed away from said predetermined operating frequency.

17. (Canceled) The array of Claim [[14]] 23, further comprising:

a respective subarray transmit/receive module coupled to an I/O port of [[each]] subarray sinuous [[feed]] feeds.

18. (Currently Amended) The array of Claim [[14]] 23 , further comprising:

a transmit/receive module coupled to the main I/O port.

19. (Currently Amended) The array of Claim [[14]] 23, further comprising a respective phase shifter coupled to an I/O port of [[each]] subarray sinuous [[feed]] feeds to provide a means for scanning the beam along a scan range in a second direction transverse to the first direction.

20. (Canceled) An antenna array, comprising:

a two-dimensional array of radiating elements arranged in rows and columns, with a spacing along each column of one half wavelength at a center frequency in an operating band;

a continuous transverse stub (CTS) radiating aperture comprising a two-dimensional set of CTS subarrays arranged in rows and columns, each subarray comprising a set of spaced continuous transverse stubs having a longitudinal extent, and wherein the radiating elements are positioned as feed elements for the CTS subarrays;

a distributed corporate feed network coupled to the array of radiating elements, said network having an input/output (I/O) port and an array of output/input (O/I) ports each for coupling to a corresponding one of the radiating elements;

said corporate feed network comprising a series feed network for each column or group of columns of said radiating elements, such that, at said center frequency, the signals at the O/I ports along each column are in-phase or at integer multiples of 360 degrees, and as the frequency varies from the center frequency, a linear phase progression along the O/I ports of each column is established.

21. (Canceled) The antenna array of Claim 20, wherein the array has an array beam at broadside at said center frequency, and an array beam away from broadside when a signal above or below the center frequency within an operating range is input at the I/O port of the distributed corporate feed network.

22. (Canceled) The antenna array of Claim 20, wherein the operating band is a millimeter wave band.

23. (New) A W-band antenna array, comprising:

a continuous transverse stub (CTS) radiating aperture comprising a two dimensional set of CTS subarrays arranged in rows and columns, each subarry comprising a set of spaced continuous transverse stubs having a longitudinal extent; and

a feed system coupled to an excitation source for exciting the stubs with W-band electromagnetic energy having a linear phase progression along the longitudinal extent of the stubs to produce an array beam which is scanned along a first direction over a beam scan range by changing an operating frequency of the excitation source over a W-band frequency range,

wherein the feed system includes, for a set of said subarrays arranged end to end along a longitudinal extent of the array –

for each subarray of said set, and input/output (I/O) port coupled to a subarray sinuous feed network and a plurality of spaced feed elements coupled to the sinuous feed network to provide a linear progressive phase shift for excitation signals applied to the subarray,

a main (I/O) port,

a series arrangement of delay lines connected to the main I/O port, and

a coupler arrangement for coupling an end of each delay line to a corresponding one of the I/O ports of said set of subarrays.